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JUGGLES' RAINBOW

Teacher's Guide

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Contents

Preface

This manual is designed to meet the needs of teachers who wish to introduce JUGGLES' RAINBOW to their students. Below is a description of the sections in the manual.

Teaching with Computers addresses several issues of concern to teachers. Here topics such as the teacher's role, setting up the workspace, and incorporating the computer into the curriculum are discussed.

Stepping through Juggles' Rainbow provides an overview of the concepts and skills which can be developed by playing JUGGLES' RAINBOW. The Learning List enumerates these for each game. This section is designed to help the teacher prepare to introduce the program to students. It may be used without a computer for those teachers who prepare their lessons at home and do not have a computer available. Each section of the software program is presented with a focus on objectives, on-line presentation, and off-line activities. The off-line activities are intended to strengthen and generalize the concepts and skills developed in each tutorial.

Keeping Current gives the names of valuable books, publications, and organizations that are national in scope and can help the teacher who wishes to learn more about computers and the educational applications of computers.

Special Keys provides a quick reference to the keys needed to play JUGGLES' RAINBOW.

It is our hope that this manual meets the needs of teachers who use it, and we welcome suggestions, comments, and ideas about its effectiveness.

Teaching with Computers

A Teacher's Role

With increasing numbers of computers in schools, we find ourselves asking how we can effectively use a new teaching tool in the classroom. What is the role of the teacher who uses computers?

Your role as a teacher is critical in a student's computer experience. You can open exciting doors of learning by selecting software that challenges students while providing them ample opportunities for success. You can help students create bridges between computer skills and concepts and the classroom curriculum. You can be a role model demonstrating openness and curiosity while introducing new ways to learn.

Today many young people have computers at home, and you may find that some of them are skilled users. If you are just learning about computers yourself, you may find that some of your students are more knowledgeable about the use of computers. You can harness this expertise and provide your computer-literate students with the chance to help you and other students learn about computers. By doing this you can give these students the gift of heightened self-esteem while gaining valuable assistants in your role as the classroom manager.

You will find that most children welcome the opportunity to use a computer. Most will quickly pick up terms and procedures. With a little guidance, they all can become competent computer users.

Your role in integrating the computer in your classroom is much the same as it is when introducing any other learning tool. Once it is selected, you prepare to use it. Then you help your students gain mastery as well. Your challenge becomes one of using the new learning tool in a creative and productive way. It takes the same amount of time and planning that goes into developing any new course and selecting the curriculum materials.

When students, especially younger ones, begin to use a computer, they will often need help with directions. You can provide those directions to the entire class, to groups, or to individuals. Once the students master basic directions, they can work alone or in groups. Children learn a great deal from working with other children. You should encourage them to share information.

In many ways, you can view the computer as a superb teacher's aide. With the right kind of software, children can feel safe taking intellectual risks. Skills and concepts can be introduced that tradi-

tionally would not be taught until much higher grades. Enrichment opportunities can be provided for any student.

Although the computer is a powerful tool for learning, it can never replace human creativity and sensitivity. The computer cannot know the skills that each of your students needs to master; nor can it know students' strengths and weaknesses. Only you, the creative teacher, can choose the software that will benefit your students, assign needed lessons, and make the critical, subjective judgments about approach that will turn the key and free a student's mind to learn.

Hardware Management

Setting Up Space: Create a Work Station Your school or classroom may be one in which a computer is already established. If so, this section may not pertain to you. However, if you are introducing a computer to your students for the first time, the following suggestions may help.

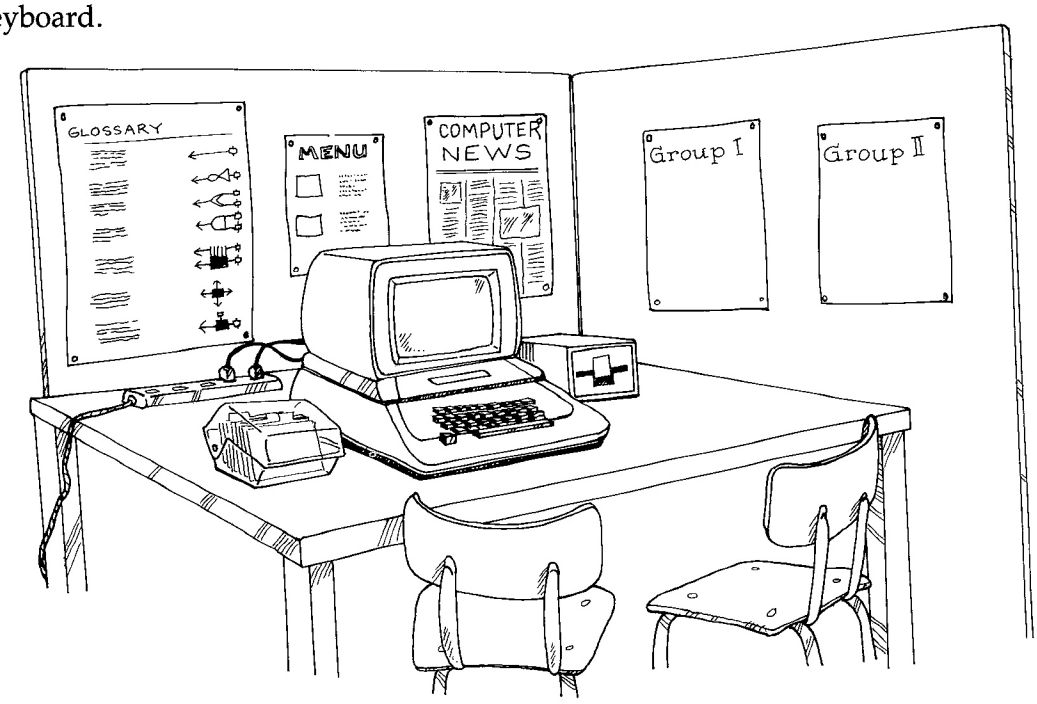
Introducing a computer to your students will probably be an exciting experience for everyone. Set aside a special place where students can explore and use the computer. It can be a place where they learn to care for the computer without fear of damaging an expensive machine. It can provide a place to focus on computer work and a place to display materials related to the concepts and skills presented by the computer programs.

Computer work stations may have the following things in common: an enclosed computer table (the enclosure provides display space); enough chairs for groups of students; and room for the entire class to sit on the floor and view the computer screen.

To set up a work station, you will need the following items:

- *A table.* If your computer is not on a portable cart, a table will be needed. It may be small enough to hold just one computer or large enough to hold more. It might have space for another student who is waiting for a turn at the computer.
- *The computer system(s).* For each system you will need a computer, a disk drive, a color monitor, and a power strip (power bus) with an on/off switch.

- *A container to hold the disks.* You can purchase special disk holders at computer stores or some educational supply houses. A covered box works almost as well if disks can stand up inside it.
- *Some way of enclosing the space.* Placing the work station in a corner of the room is an easy solution. If you don't have an extra corner, you can construct a three-part standing screen by using fiber board, heavy cardboard (even a refrigerator carton), or wood. If you choose fiber board or wood, you will need hinging devices. If you use heavy cardboard, you will need reinforcements on the bottom to make it stand upright. An alternative could be to turn the screen away from the view of the classroom.
- *Display space.* You can hang bulletin boards right on the walls if your work station is in a corner. A wooden enclosure can be covered with cork or fiber board. If you use fiber board or heavy cardboard for your work station, you can display materials directly on the station's enclosing walls.
- *Materials for working on the bulletin board.* Pens, pencils, paper, erasers, pushpins, tape, string, and containers to hold such materials are items to consider. You should place these items distant from the computer or make them unavailable to students to avoid tempting them to experiment with the keyboard.



Setting Up the Computer Setting up the computer can become a classroom adventure. In our experience, even young children can become competent at setting up and taking down computer systems. In fact, we know of some classrooms where the children instruct the teachers.

Discuss ahead of time your ground rules for using the computer. (No food or drinks around it; use it gently; do not put anything into or on the computer, etc.). Warn students' that items such as food, paint, clay, magnets, paper clips, or any liquid that might spill into the computer can cause damage to the computer unit. You may even want to have a guest speaker discuss these issues and answer students' questions.

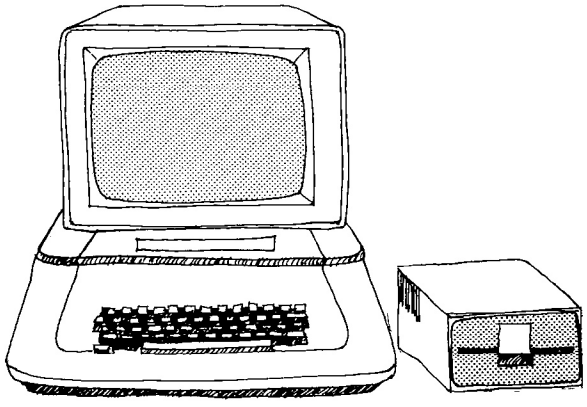
The manual that comes with your computer will explain the details of how to set up your specific machine. However, we are including some tips learned over time.

- *Ground your computer.* Computers have three-prong plugs and must be plugged into a wall socket that is actually grounded. Some older buildings do not have proper grounding, so have your custodian check this.
- *Use a power strip with an on/off switch.* Instead of plugging your computer directly into the wall socket, consider using a power strip. It has multiple sockets and can compensate somewhat for lack of sufficient electrical outlets. It serves the purpose of an extension cord, but is sturdier. Using the on/off switch on the power strip to turn the computer on and off can reduce wear and tear on the computer's power switch.
- *If you are using a television, you will need a frequency modulator.* Frequency modulators to convert the TV into a computer monitor are inexpensive at computer supply stores. They attach to the TV's antenna leads and, by a cable, to the computer. See the instructions that come with the frequency modulator. Regular monitors do not need frequency modulators and they usually come with three-prong plugs that can be plugged into the power strip.
- *Open up your computer.* You can do this with most, but not all, computers. Look inside. This is a good time to introduce your students to computer terminology. They can see the silicon chips. The large board that everything else is plugged into is called the mother board. The disk drive has a peripheral card that is plugged into a specific slot. There is also a special port for a joystick if you will be using one. See your machine manuals.

- *Handle disks with care.* Hold disks only by the label or by the black jacket and teach your students to do the same because the oil from your fingers can damage the surface of the disks. Disks can be damaged easily by bending, pressure (writing on the affixed label with pen or pencil), heat (sunlight, heaters, storage areas), magnetic fields (magnets, paper clips stored in magnetic containers, being placed on or around disk drives, telephones, fans, motors, loudspeakers, or air conditioners).
- *Cover your computer.* The computer hardware may need special attention, too. Large plastic or cloth sheets may be used to cover the computer to protect it from dust when not in use.

Tell students that *starting-up* means putting the disk into the disk drive, closing the door, and starting the computer. This is the proper order for Apple computers. Explain to students that to put the disk into the disk drive, they must slide it gently until it stops. Jamming it roughly or pushing it in too far can result in a damaged disk. The disk drive may make a whirring or clicking sound as it is loading. A red light on the disk drive will light until the loading is finished. Tell students that the red light is like a stop sign; do not open the door to remove a disk or to put another one in when the light is on.

You can explain to your students that the disk is spinning very fast inside the disk drive. Heads in the disk drive resemble those on a tape recorder and they read the disk's information. The information travels through the wide cable running from the disk drive to the computer and is stored there in RAM (random access memory) chips. You can see these in an Apple II computer. Ask students to keep the doors to the disk drives closed when not in use; this keeps the heads from getting dirty.



Classroom Management Tips

Here are a few tips that we have found useful for classroom presentations.

One Computer: Everyone Plays At the present, most classrooms have only one computer. In fact, the teacher who has access to one computer that does not need to be shared is considered quite fortunate. How to manage this resource is of some concern.

Computer programs work very well in classroom presentations. The main limitation is having a large enough screen so that everyone can see. When teachers introduce the programs to the entire class at the same time, students know what to expect and have a better idea of what they need to do when they work individually at the computer. One presentation that works well is to have students take turns running the programs and playing the games as the rest of the class watch and advise.

As you work with your class, you will discover new ways to encourage student involvement. The students will make interesting suggestions as well.

Two at the Computer: Parallel Play Another way to manage a classroom presentation is to have one or two students playing the game at the computer while the rest of the class are involved in an off-line activity. With shorter games, all of the students may have an opportunity for a brief time at the computer during one class presentation. Some of the activities in this book are suggested off-line activities. They can be used to extend the concepts developed in the computer games.

The three games of JUGGLES' RAINBOW are one-player games. However, two children, taking turns and helping each other, learn more than a single child working alone. Therefore, we recommend that students work with partners at the computer.

Stepping Through Juggles' Rainbow

JUGGLES' RAINBOW may well be the first computer program you introduce to your class. Here the computer, if used properly, can act as a bridge between the concrete and the abstract understanding of some concepts that are difficult for many children to incorporate. These are the concepts introduced in JUGGLES' RAINBOW: above, below, left, and right.

Children should experience the spatial aspects of above, below, left, and right in many different ways. Some possible ways are through movement activities, games, and activity pages. At the computer, they experience the relationship between pressing keys on the computer keyboard and the feedback they receive on the screen. Every time a key is pressed in JUGGLES' RAINBOW, something happens. This is a step toward abstraction—from physically placing objects above or below a line and seeing them "right there" to pressing keys above and below a line on the keyboard and seeing something happen "up there" on the screen.

The computer, together with appropriate software, can be a powerful new tool in the classroom. When introduced carefully, it can enhance learning tremendously.

JUGGLES' RAINBOW may be seen as one positive way for children to learn concepts as they also learn to use the computer at the same time. Together with this computer experience, healthy doses of songs, discussion, climbing, drawing, playing, and dancing for learning and reinforcing these concepts are strongly recommended. Growing children benefit from such experiences in their daily lives.

The following sections provide detailed descriptions of the games as well as specific suggestions for how the games can be presented to your class. Also included are activities that relate to the games in JUGGLES' RAINBOW.

These activities may be used in several ways. They can be used as introductory exercises or as off-line activities while other children use the computer. Some pages may be used as follow-up activities after all the children have played the computer games. Feel free to experiment using the activities in different ways to discover how they can be of the most value to you.

The disk contains three separate games: "The Rainbow Game" teaches the concepts of above and below; "The Butterfly Game" deals with left and right; "The Windmill Game" combines the concepts of above and below, left and right.

Within each of the games there are three lessons. The first lesson introduces the concept, the second lesson expands upon the concept, and the third lesson provides a colorful, playful environment in which to explore and discover new ways to think about the concept.

In all three games in JUGGLES' RAINBOW, there are both play and test modes. In the play mode, children explore the keyboard and the concepts. In play modes, any key pressed will make something happen. For example, if a child presses a key below a given point on the computer keyboard during "The Rainbow Game," the word BELOW will appear on the computer screen.

In the test mode, children test their understanding of the concepts. The test mode is signified by a blue frame on the screen. In this mode, the child needs to follow the directions provided by the computer. For example, if a child is asked to press a key below a given point on the keyboard but presses a key above that point, this message will appear on the screen: THAT WAS ABOVE. NOW PRESS BELOW. The child has a second chance to respond correctly. However, if the child presses another key above the given point, the computer returns the child to the play mode for more experience.

Learning and the JUGGLES' RAINBOW Courseware

JUGGLES' RAINBOW is designed to help very young children learn reading and math readiness skills. It does so while providing a gentle, colorful, playful introduction to the computer.

Many of the concepts introduced in JUGGLES' RAINBOW are the basic skills needed for proficiency in reading. In reading English, children must learn to track their eyes from the top of a page to the bottom, and from the left of a page to the right. JUGGLES' RAINBOW aids in developing top-to-bottom orientation while encouraging left-to-right eye-tracking.

Knowing the concepts of above, below, left, and right increase letter recognition ability. JUGGLES' RAINBOW helps children discriminate between the appearance of different letters. The games in JUGGLES' RAINBOW allow children to become familiar with letters as shapes before they need to know and use them as actual letters.

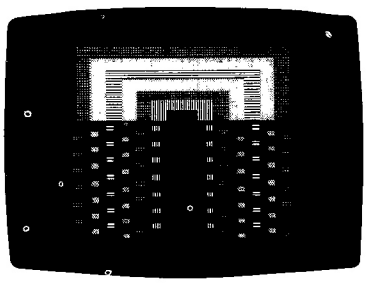
Many of the concepts introduced in JUGGLES' RAINBOW are the foundation skills for proficiency in mathematics. Counting, an early basic skill, is built into JUGGLES' RAINBOW. After five correct responses, a

new level of each game is introduced. Children playing JUGGLES' RAINBOW can count the keys pressed as they place colored bars or fill in rectangles on the screen. Children can also count the number of keys pressed to match the colors of rain and rainbow, butterfly wings, or windmill arms at the end of the games in JUGGLES' RAINBOW.

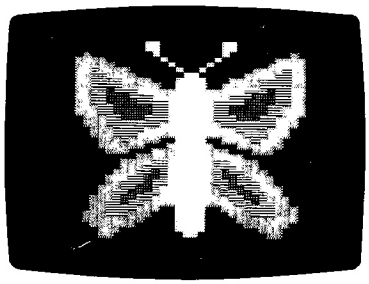
Recognizing and distinguishing shapes is fundamental to geometry and logical thinking. There are many basic shapes in JUGGLES' RAINBOW. Children experience them on the screen. The shapes can be given names by the teacher when appropriate.

Following directions is an important skill for students to learn. In JUGGLES' RAINBOW directions are given in three ways. In each game, a flashing cursor indicates when the computer is ready to receive a student's input. In addition, graphic clues direct students to specific regions on the keyboard: above or below; left or right; and combinations of above or below with left or right. Lastly, students see written directions, such as NOW PRESS ABOVE or THAT WAS BELOW, that accompany picture clues on the screens. These written directions should be presented verbally as well.

The Learning List

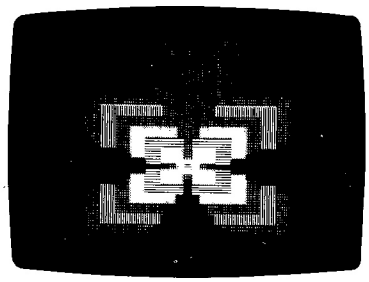
Games	Concepts and Skills Presented
1 The Rainbow Game	
	▪ Relating horizontal planes (keyboard) to vertical planes (screen). ▪ Recognizing opposites (above and below). ▪ Learning spatial awareness (above and below; halves). ▪ Following directions. ▪ Noticing pattern development (rainbow). ▪ Matching colors (rainbow to rain). ▪ Eye-tracking from left to right.

2 The Butterfly Game



- Relating horizontal planes (keyboard) to vertical planes (screen).
- Recognizing opposites (left and right).
- Learning spatial awareness (left and right; halves).
- Following directions.
- Noticing pattern development (butterfly).
- Matching colors (butterfly wings).
- Eye-tracking from top to bottom.

3 The Windmill Game



- Relating horizontal and vertical planes (keyboard to screen).
- Pairing concepts (above and left; below and right).
- Learning spatial awareness (quadrants).
- Following directions.
- Identifying the shapes of "b," "d," "p," and "q," four letters of the alphabet that are the most difficult to distinguish.
- Noticing pattern development (windmill).
- Matching colors (windmill blades).
- Noticing two-way symmetry (windmill blades).

Starting Up the Program

Have the children sit on the floor in front of the computer. Make sure that all of them can see the screen, and, if possible, the computer keyboard. Point out and name the parts of the computer: monitor, computer, disk drive. Carefully remove the JUGGLES' RAINBOW disk from its package and place it in the disk drive. Explain to the children the importance of holding the disk by its label as it is inserted into the disk drive. Turn on the monitor and the computer. Be sure the CAPS LOCK key is pressed down. The JUGGLES' RAINBOW program is being loaded into the computer.

First the Learning Company logo appears on the screen. Then the picture menu appears. The picture menu provides clues about the games to pre-reading children. Games are selected by pressing the appropriate number key on the keyboard. After the children have worked with the games once, they will recognize the symbols in the menu and will be able to press the number of the game they wish to play—1, 2, or 3.

Number 4 provides instructions for playing the games. By pressing 4, you can also turn the sound off (or on), and choose whether or not to use the picture clues during the games.

You will need to prepare two blue strips that will be used for all the games in JUGGLES' RAINBOW. One strip will be used to divide the computer keyboard horizontally, and the other to divide the keyboard vertically. The strips should be blue to conform to the color of the strips on the monitor display. You may wish to use pieces of yarn as strips.

To select a game, ask a student to press the appropriate number on the keyboard. The red light on the disk drive will come on. The disk drive will make a whirring sound. Explain to the children that the computer is now reading the game from the disk where it is stored and putting it into its memory so that the game can be played. Ask the children to imagine the computer as an empty brain and the disk as a rule book. The disk drive helps the computer read the rule book so that it knows how the game is played. Once the computer is turned off, it forgets everything about the game. The program would need to be loaded again in order to play the game.

Warn your students never to touch the disk when the red light is on. This could damage the disk as well as the disk drive.

There are some important keys to know about:

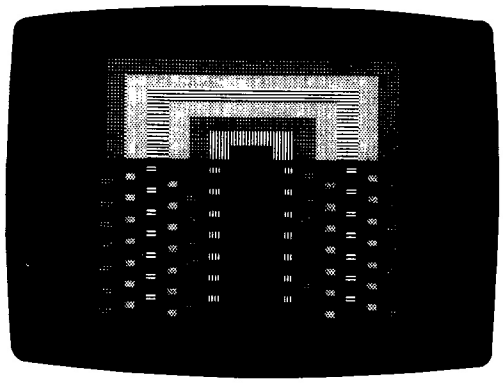
SHIFT ? The SHIFT and the ? keys return you to the picture menu. Both keys must be held down at the same time.

SPACEBAR The SPACEBAR skips the opening pictures, or the next part of the game, or puts you back at the beginning of a game, depending on where you are in the game.

Point out the location of these keys on the keyboard. You may wish to explain their use now, or wait until the information is needed during the game.

1 The Rainbow Game

Objectives



- Relating horizontal planes (keyboard) to vertical planes (screen).
- Recognizing opposites (above and below).
- Learning spatial awareness (above and below; halves).
- Following directions.
- Noticing pattern development (rainbow).
- Matching colors (rainbow to rain).
- Eye-tracking from left to right.

In this game, children are introduced to the concepts of above and below.

Prepare a blue strip to be used with "The Rainbow Game." The longer of the two strips is used in this game. Place it on the computer keyboard in such a way that it divides the keyboard horizontally into two sections. (Place it on top of the middle row of letters.)

On-Line Presentation

After the program has been loaded and the menu appears, press [1] to load "The Rainbow Game." The words USE [?] TO RETURN TO PICTURE MENU appear on the screen; then the word ABOVE appears at the top right of the screen. Read the word to your class. The word then disappears and a juggler on top of a box appears. Then the word BELOW appears at the bottom left of the screen. Read this word to the children. When it disappears, another juggler appears. One juggler is above; the other is below.

Lesson 1, Play Mode You will see a horizontal blue line on the screen. Point out that the blue strip on the screen corresponds to the blue strip on the computer keyboard. The keyboard and the screen have both been divided horizontally into above and below sections. A flashing cursor indicates that the computer is ready to receive input. Point out the cursor to the class. Invite one of the children to press a key. If the child presses a key above the blue strip on the keyboard, a colored bar appears above the screen's blue

line, and the word ABOVE appears on the screen. A key pressed below the strip results in a colored bar appearing below the screen's line, and the word BELOW appears on the screen. Invite other children to press a key, one at a time. A bar and the word naming its location ABOVE or BELOW will appear on the screen. After five keys are pressed, the colored bars disappear and music plays.

Lesson 1, Test Mode A blue box now surrounds the blue bar on the screen. This indicates the beginning of the test mode. Visual and word clues appear. The visual clue is an incomplete bar extending above or below the blue strip on the screen. The word clue states NOW PRESS ABOVE or NOW PRESS BELOW, according to where the incomplete bar is. When this screen appears, ask the children where they think they should press a key. When a correct key is pressed, the bar will fill with color, and it will be named either ABOVE or BELOW.

The test mode consists of five turns. Let the children take turns responding in the test mode. At some point, ask the children to guess what will happen if an incorrect key is pressed. Let someone try it to find out. (The child is automatically taken back to the play mode after an incorrect key is pressed a second time.) Explain that you always get two chances to press a key in the area on the keyboard that the clue is hinting at. After the children have successfully completed the test mode, the screen becomes a solid color and music plays. This concludes Lesson 1.

Lesson 2, Play Mode Now a new exercise begins. The blue line has disappeared from the screen and two boxes that are outlined in color appear on the screen. One is slightly to the left and above the other. Invite a child to see what will happen by pressing any key. If a child presses a key above the blue strip on the computer keyboard, the higher box will fill with color and the word ABOVE appears on the screen. If the child presses a key below the blue strip on the computer keyboard, the lower box will fill with color and the word BELOW appears. Invite other children to press keys in this play mode. After five keys are pressed, the test mode begins.

Lesson 2, Test Mode The familiar blue line surrounds the boxes on the screen. In the center of one of the boxes is a colored rectangle. This is the visual clue, indicating the location on the keyboard of the key to be pressed. Word clues will also appear. Invite a child to come to the computer and press a key. If the child presses a "below" key, the lower box will fill with color. Then another set of boxes, one containing a colored rectangle, will appear. Invite another child to respond. After five turns, the screen will become a solid color and music will play. This ends the test mode for Lesson 2.

Lesson 3, The Rainbow There is no test mode in this section. It is exploratory play throughout. A flashing cursor and the words PRESS ONE KEY appear on the screen. If the child presses a key above the blue strip on the computer keyboard, one band of a rainbow appears. More "above" presses generate more bands in the rainbow. If a child presses a key below the keyboard strip, two vertical streams of rain appear, corresponding to a band of color in the rainbow. More "below" presses bring more rain. Music accompanies each key press. When the rainbow and rain are completely filled in (6 key presses above and below), continued key presses result in a cycling of colors.

Children may like to play matching games at this point. Perhaps one child can press some keys, above and below. Another child can try to match those rainbow and rain colors.

You may choose not to introduce Lesson 3 and allow your class to discover it on their own. Do what is appropriate for your own group of children.

Off-Line Activities

BLUE SASH GAME This activity gives children the opportunity to have some concrete experiences with the concepts of ABOVE and BELOW. Because students use their own bodies, the concepts are more easily understood.

You need:

- Sashes of fabric, ribbon, or crepe paper for each child and adult.
- Scissors.

Tie sashes around the waists of all the participants. Have an adult say, "The blue sash is around my waist. Who can name something that is ABOVE my waist?" This type of questioning should be repeated a number of times, each time asking for items ABOVE or BELOW the blue sash.

Have an adult name parts of the body or articles of clothing as they come up in the game (knee, face, eye, shoulder, shoes, etc.). Children can take turns leading the game when they are ready.

I SPY GAME In this activity, the children begin to recognize ABOVE and BELOW when applied to objects other than their own clothing or bodies. However, to begin, choose objects related to their own persons; then extend the play to items beyond themselves.

You need:

- One blue sash for each child.

Gather the children in a circle and ask them to point to themselves somewhere ABOVE their waists. Then ask the children to point to themselves somewhere BELOW their waists. Check that all the children have understood correctly. Say, "I spy, with my little eye, something ABOVE my waist that is purple." (For this example, we will assume that you are wearing a purple scarf.) Have the children guess the object. When the object has been discovered, say, "Yes! My purple scarf is ABOVE my waist!" Select other objects on your person to have the children continue guessing ABOVE and BELOW in this way.

When children understand the game, name some objects that are on them. Then mention objects in the room that can be named. If sounds or letters are being introduced, those lessons can be combined with this activity. For example, "I spy, with my little eye, something ABOVE my waist that begins with *m*." The game can be extended to include middle and ending sounds as well.

HOW HIGH IS ABOVE? HOW LOW IS BELOW? In this activity, children begin by naming an object that is ABOVE a blue strip. Then, they name an object that is ABOVE the object that was just referred to. This goes on and on, using the last object mentioned in the next question.

You need:

- A blue strip cut out of tagboard, about 1 yard long and 2 inches wide.
- Scissors.
- Rulers.

Place the blue strip horizontally about midway up on the blackboard (or on some other convenient place, such as a table edge or side of a desk.) Gather the children in a circle on the floor. Begin the game

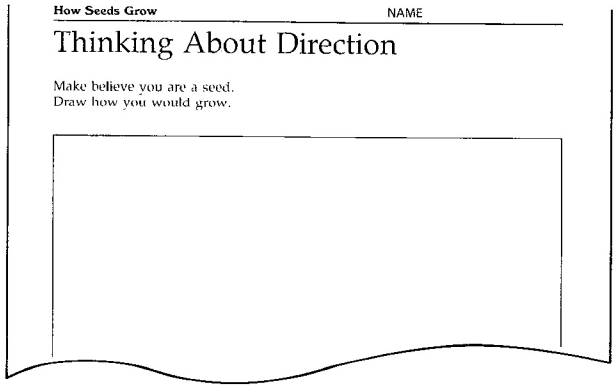
by asking, "Can someone name something just ABOVE this blue line?" Then extend the game by asking the same question again, but this time ask them to name something farther ABOVE what was "ABOVE this blue line." See how far the children can go with this naming of things ABOVE other things already mentioned.

Repeat this game with questions concerning BELOW the blue strip, including the last answer in each succeeding question.

HOW SEEDS GROW In this activity, children are asked to think about how seeds grow, thereby using the words ABOVE and BELOW in a new context. Then, they act out their ideas.

You need:

- An activity sheet (page 1) for each child.
- Children to play the parts: 3 planters, 3 seeds, and 1 sun.
- Costumes or symbols for the actors.
- A brown strip of tagboard symbolizing dirt or ground level.
- Paper to make watering cans and flowers (optional).
- Crayons.
- Scissors.
- Seeds, soil, water, paper cups (optional).


How Seeds Grow NAME

Thinking About Direction

Make believe you are a seed.
Draw how you would grow.

Place the "dirt" strip across the edge of a table. Have children who are planters kneel on the table and dig with their hands BELOW the ground level. Have the planters bring in the children who are the seeds and "plant" them. The "seed" children crouch in seed balls BELOW the dirt as the planters pat the dirt around them while the sun stands to one side, sending warmth to the seeds. Then have the planters return and "water" the seeds with their hands or paper watering cans. The seeds begin to send roots BELOW their bodies. Tell children to stretch out their legs. Shoots emerge ABOVE the ground level. Tell children to stretch out their arms. The shoots continue to grow until there are flowers. The children may have made paper flowers to display at this point.

Now the teacher can ask, "What did it feel like BELOW the ground? What helped you to grow ABOVE the ground? What helped you to bloom ABOVE the ground?" Children can take turns being the different actors and the play can be repeated. Finally, suggest that the children draw a picture of themselves as seeds growing. You may also want to plant real seeds and watch them grow.

STRIPS AND BARS This activity relates directly to what happens on the screen during JUGGLES' RAINBOW. It can be used as an off-line or a post-computer experience for two children at a time.

You need:

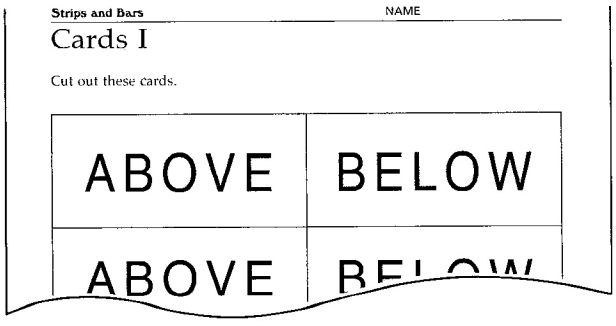
- 2 strips of blue tagboard, about 18 inches long and 2 inches wide.
- 10 rectangular tagboard bars, about 1 inch by 5 inches, two bars of five different colors.
- Scissors.
- Rulers.

Divide the class into groups of two. Give each child in each group a blue strip and one set of colored rectangles. Place the blue strips horizontally, next to each other, on a flat surface. Have one child make a pattern by placing some or all of the rectangles ABOVE and/or BELOW the first blue strip. The rectangles extend vertically from the strip just as they do in the computer game. The second child duplicates this pattern next to the second blue strip. Then the second child makes a pattern and the first child duplicates it.

STRIP, BARS, AND CARDS This activity extends the previous activity by including some reading.

You need:

- Three activity sheets (pages 2, 3, and 4) for each pair of children. (After the cards are cut out, paste them on 3 × 5 index cards. If desired, cover them with clear adhesive plastic.)
- One blue tagboard strip and one set of colored rectangles from the Strips and Bars activity for each pair of children.

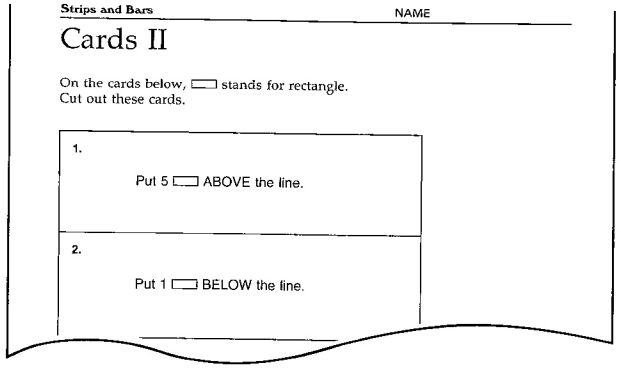

Strips and Bars NAME

Cards I

Cut out these cards.

ABOVE	BELOW
ABOVE	BELOW

Two children sit together. Place the blue strip horizontally on a flat surface in front of them. One child has the colored rectangles, the other child has the cards (5 cards say ABOVE, 5 cards say BELOW, 10 cards have specific instructions on them). The child with the cards reads a card. The child with the colored rectangles follows the directions that are read. If the ABOVE/BELOW set is in use, the child will merely place the rectangles in a pattern, so that the rectangles extend vertically from the strip. If the second set of cards is in use, the child with the colored rectangles does as the card states. At any time, the roles of the children can be reversed.



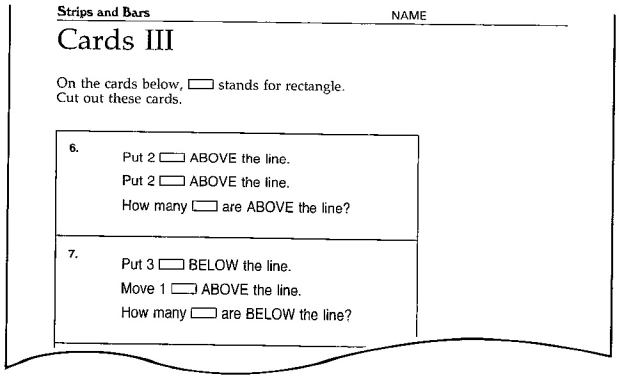
Strips and Bars NAME

Cards II

On the cards below, ▭ stands for rectangle.
Cut out these cards.

1. Put 5 ▭ ABOVE the line.

2. Put 1 ▭ BELOW the line.



Strips and Bars NAME

Cards III

On the cards below, ▭ stands for rectangle.
Cut out these cards.

6. Put 2 ▭ ABOVE the line.
Put 2 ▭ ABOVE the line.
How many ▭ are ABOVE the line?

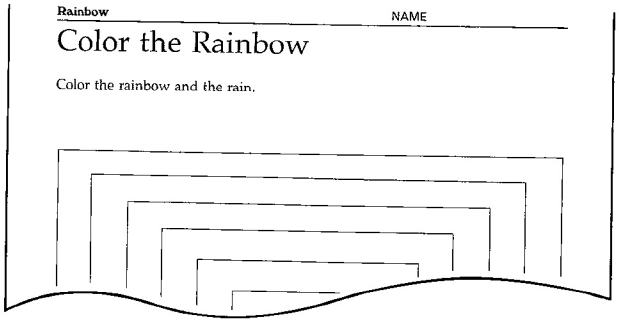
7. Put 3 ▭ BELOW the line.
Move 1 ▭ ABOVE the line.
How many ▭ are BELOW the line?

RAINBOW In the activity, children may copy the colors that they saw in the computer program, or they may color the page with whatever colors they wish to use.

You need:

- One activity sheet (page 5) for each child.
- Crayons or felt tip pens.

Have the children color the rainbow and the rain. You may want to discuss how the color of the rain matches the color of the rainbow bands in the computer game.



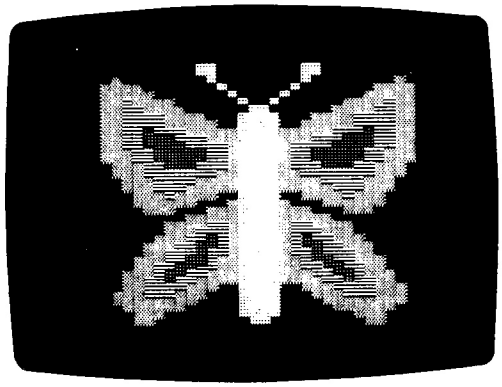
Rainbow NAME

Color the Rainbow

Color the rainbow and the rain.

2 The Butterfly Game

Objectives



- Relating horizontal planes (keyboard) to vertical planes (screen).
- Recognizing opposites (left and right).
- Learning spatial awareness (left and right; halves).
- Following directions.
- Noticing pattern development (butterfly).
- Matching colors (butterfly wings).
- Eye-tracking from top to bottom.

In this game, children are introduced to the concepts of left and right.

Prepare a blue strip to be used in "The Butterfly Game." The shorter of the two strips is used in this game. Place it on the computer keyboard in such a way that it divides the computer vertically into two sections.

On-Line Presentation

Press [2] when the menu screen appears. "The Butterfly Game" will load. The words USE [?] TO RETURN TO PICTURE MENU appear on the screen. Jugglers again appear on the screen. Here they are identified in their positions of LEFT and RIGHT. Read the words to your students.

Lesson 1, Play Mode Now you will see a vertical blue line on the screen. Point out that the blue strip on the screen corresponds to the blue strip on the computer keyboard. Both the keyboard and the screen are divided into left and right sections. A flashing cursor indicates that the computer is ready to receive input. Point out the cursor to the class. Invite one of the children to press a key. If the child presses a key to the left of the blue strip on the keyboard, a colored bar appears to the left of the screen's blue line, and the word LEFT also appears. A key pressed to the right of the strip results in a colored bar appearing to the right of the screen's line, and the word RIGHT also appears. Invite other children to press a key, one at a time. After five keys are pressed, the colored bars disappear and music plays. This ends the play mode for Lesson 1.

Lesson 1, Test Mode A blue box now surrounds the blue bar on the screen. This indicates the beginning of the test mode. Visual and word clues appear. The visual clue is an incomplete bar extending to the right or to the left of the blue vertical strip on the screen. The word clue states NOW PRESS ON THE LEFT or NOW PRESS ON THE RIGHT according to where the incomplete bar is. When this screen appears, ask the children where they think they should press. If a child responds correctly, let him or her come up to the computer and press a key. When a correct key is pressed, the bar will fill with color. It will be named either LEFT or RIGHT.

The test mode consists of five screens. Let the children take turns responding in the test mode. At some point, ask the children to guess what will happen if an incorrect key is pressed. Let someone try it to find out. (The child is automatically taken back to the play mode after an incorrect key has been pressed a second time.) Explain that you always get two chances to press a key in the area on the keyboard that the clue is hinting at. After the children have successfully completed the test mode, the screen becomes a solid color and music plays. This concludes Lesson 1.

Lesson 2, Play Mode Now a new left and right exercise begins. The blue bar has disappeared from the screen and a red circle appears. Invite a child to see what will happen by pressing any key. If a child presses a key to the left of the blue strip on the computer keyboard, a colored vertical bar will appear touching the left side of the red circle. If the child presses a key to the right of the blue strip on the keyboard, a colored vertical bar will appear touching the right side of the red circle. One at a time, invite other children to press keys in this play mode. After five keys are pressed, the test mode begins.

Lesson 2, Test Mode The familiar blue box encloses the screen. In the center of the screen is a red circle with an incomplete vertical bar touching its right side or its left side. This is the visual clue indicating the location on the keyboard of the next key to be pressed. Word clues also appear. For example, if the incomplete bar is to the right of the circle, the words NOW PRESS ON THE RIGHT will appear. Invite a child to come to the computer and press a key. If the child presses a "right" key, the bar will fill with color. Then another circle with an incomplete bar on one side will appear. Invite another child to respond. After five turns, the screen will become a solid color and music will play. This ends the test mode for Lesson 2.

Lesson 3, The Butterfly There is no test mode in this section. It is exploratory play throughout. A flashing cursor and the words PRESS ONE KEY appear on the screen. If the child presses a key to the right

of the blue strip on the computer keyboard, a section of a butterfly wing appears to the right of the vertical strip on the screen. The blue strip has become the body of a butterfly. More "right" keys pressed will fill in the sections of the right wings of the butterfly. If a child presses a key to the left of the keyboard strip, a section of the left wings will fill in with color at each press. Again, invite children to take turns pressing keys to discover what will happen. Music accompanies each keypress. When the butterfly's wings are completely filled, continued pressing of keys results in a cycling of colors.

Children may like to play matching games at this point. Perhaps one child can press some keys, left and right. Another child can try to match those wing colors. You may choose not to introduce Lesson 3 and allow your class to discover it on their own. Do what is appropriate for your own group of children.

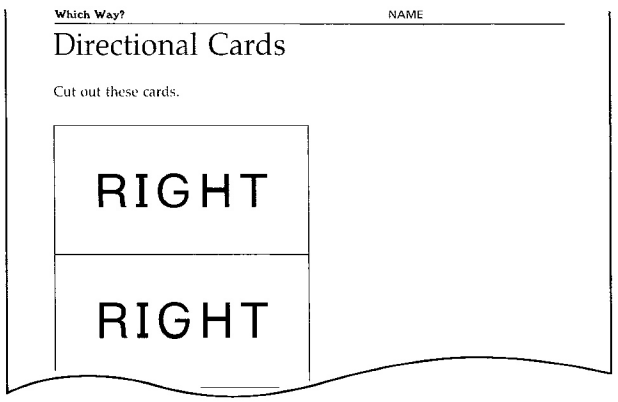
To return to the picture menu to play another game, press SHIFT and ?. To return to Lesson 1 of the same game you have been playing, press SPACEBAR.

Off-Line Activities

WHICH WAY? This activity involves children in a concrete experience with the concepts of left and right. Because students use their own bodies, the concepts are more easily understood.

You need:

- One activity sheet (page 6) for the class.
- Blue crepe paper.
- Scissors.


Which Way? NAME

Directional Cards

Cut out these cards.

RIGHT

RIGHT

Unroll the crepe paper so that it divides your meeting area (rug, circled area, etc.) into two vertical parts. Have everyone gather at the "bottom" of the space, looking towards the blue vertical line. Ask the children which side is left. Have a child place the word card that says LEFT at the top left side of the area. Ask the children which side is right. Ask a child to place the word card that says RIGHT at the top right side of the area.

After children have established the left and right side of the area, ask all children wearing red (for example) to stand on the LEFT side of the blue line. Ask all children wearing shoes that tie to stand on the RIGHT side of the blue line. Continue with colors, clothing, what was eaten for breakfast, favorite TV shows, or initial sounds of names for as long as interest holds. The children should move from left to right and right to left as new characteristics are mentioned.

I SPY GAME In this activity, the children begin to recognize LEFT and RIGHT in a broader context.

You need:

- Left and right cards from the previous activity (page 5) for the class.
- Blue crepe paper.
- Scissors.

Gather the children in a circle. Place a strip of crepe paper down the middle of the circle, dividing it into two halves. Call on children to place the LEFT and RIGHT word cards on the appropriate halves of the circle. (Some discussion may ensue about orientation: If I'm near the top of the circle, my right may seem left, etc. Encourage discussion. For children who are really having trouble, suggest that they place themselves on the circle so the orientation is clear. If there are too many problems, rearrange the group so that they are sitting in a line or grouped right and left, all facing the same direction.) Then say "I spy, with my little eye, someone on the LEFT who is wearing red." Use the children, then other objects in the room: "I spy, with my little eye, something on the LEFT to sit on, etc. "

If sounds or letters are being introduced, those lessons can be combined with this activity. For example, "I spy, with my little eye, something to the LEFT of the line that begins with *r* (rug)." The game can be extended to include middle and ending sounds.

JUGGLES SAYS This activity is a variation of the game Simon Says. It reinforces the children's understanding of the concepts of LEFT and RIGHT.

You need

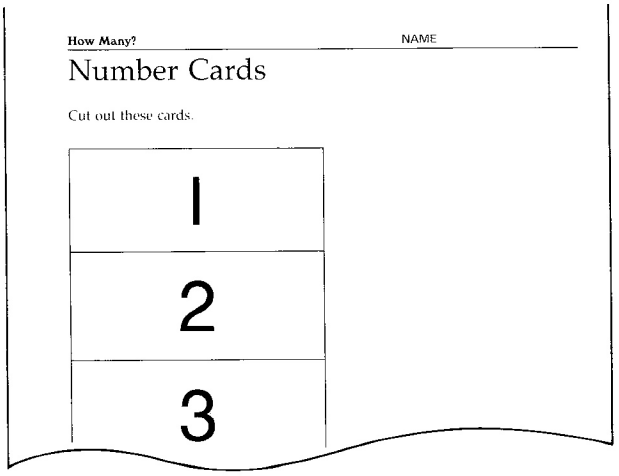
- A clown hat.

Choose someone to be Juggles. That person wears the hat. (In the beginning, you may want to be Juggles, but as the children get more proficient, they can play the role.) Follow the procedure for playing Simon Says, but use left and right in the directions. For example, "Juggles says touch your LEFT hand to your nose," "Juggles says hold out your RIGHT hand and put your LEFT hand on your head," "Juggles says turn around to your LEFT and balance on your RIGHT foot," etc. (Commands can be as simple or as complicated as is appropriate.)

HOW MANY? This beginning math game uses the concepts of LEFT and RIGHT.

You need:

- One activity sheet (page 7) for the class.
- Blue crepe paper or blue chalk.
- One set of LEFT and RIGHT word cards from previous activities for the class.
- Paper and felt tip pens.
- Scissors.


How Many? NAME

Number Cards

Cut out these cards.

1

2

3

Go outside and choose an area on the playground for the game. Use the paper strip or chalk to divide the area vertically into left and right regions. Place the word cards, if necessary, to identify the regions. Have the children divide themselves into two groups, half on each side of the blue line, and have someone in each group count how many children are on that side. Record a number for each group on a piece of paper, and place it at the bottom of the region. Arrange the number cards face down and ask a child on the LEFT to pick a card. If the child picks a 3, the child chooses three children from the RIGHT to come over to the LEFT. Then have the children recount each group.

Explain what happens as you change the number at the bottom of each region. For example, "There were 17 children on the LEFT and 12 children on the RIGHT. Jennifer chose three people to come to the LEFT. Now there are 20 children on the LEFT and 9 children on the RIGHT." Play for as long as the group is interested.

STRIPS AND BARS This activity relates directly to what happens on the screen during JUGGLES' RAINBOW. It can be used as an off-line or a post-computer experience for two children at a time.

You need:

- 2 strips of blue tagboard, about 18 inches long and 2 inches wide.
- 10 rectangular tagboard bars, about 1 inch by 5 inches, two bars of five different colors.
- Scissors.
- Rulers.

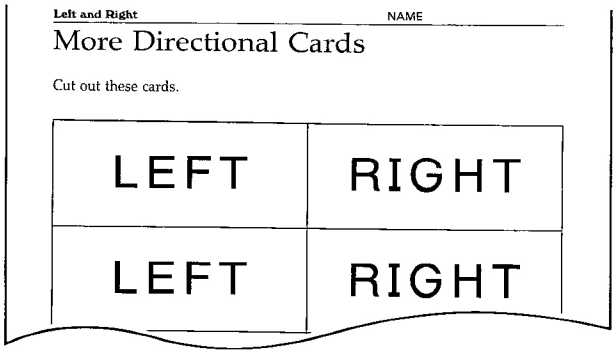
Divide the class into groups of two and give each child in each group a blue strip and one set of colored rectangles. Place the blue strips vertically, next to each other, on a flat surface. Have one child make a pattern by placing some or all of the rectangles to the RIGHT and/or to the LEFT of his or her blue strip. (The rectangles extend vertically from the strip as they do in the computer game.) The second child duplicates this pattern next to his or her blue strip. Then have the second child make a pattern and the first child duplicate it.

LEFT AND RIGHT This activity extends the previous activity by including some reading.

You need:

- Three activity sheets (pages 8, 9, and 10) for each pair of children.
- One blue tagboard strip and one set of colored rectangles from the Strips and Bars activity for each pair of children.

Have two children sit together and place the blue strip vertically on a flat surface in front of them.


Left and Right NAME

More Directional Cards

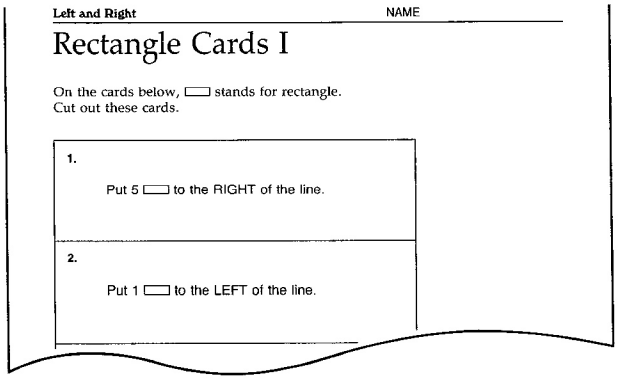
Cut out these cards.

LEFT	RIGHT
LEFT	RIGHT

Give one child the colored rectangles and the other child the cards (5 cards say LEFT, 5 cards say RIGHT, 10 cards have specific instructions on them). The child with the cards reads a card and the child with the colored rectangles follows the directions that are read.

If the LEFT/RIGHT set is in use, the child will merely place the rectangles in a pattern so that the rectangles extend horizontally from the strip. If the second set of cards is in use, the child with the colored rectangles does as the card states.

At any time, the roles of the children can be reversed.



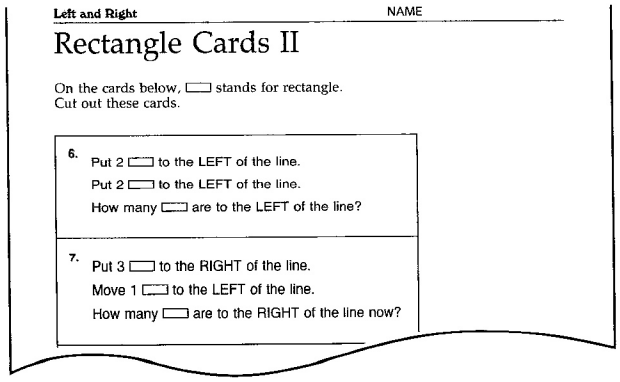
Left and Right NAME

Rectangle Cards I

On the cards below, ▭ stands for rectangle.
Cut out these cards.

1. Put 5 ▭ to the RIGHT of the line.

2. Put 1 ▭ to the LEFT of the line.



Left and Right NAME

Rectangle Cards II

On the cards below, ▭ stands for rectangle.
Cut out these cards.

6. Put 2 ▭ to the LEFT of the line.
Put 2 ▭ to the LEFT of the line.
How many ▭ are to the LEFT of the line?

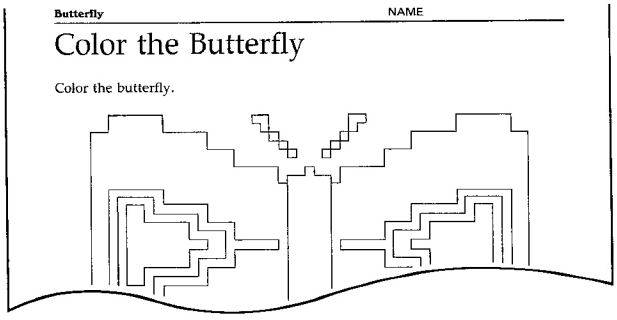
7. Put 3 ▭ to the RIGHT of the line.
Move 1 ▭ to the LEFT of the line.
How many ▭ are to the RIGHT of the line now?

BUTTERFLY In this activity, children may copy the colors that they saw in the computer program, or they may color the page with whatever colors they wish to use.

You need:

- One activity sheet (page 11) for each child.
- Crayons or felt tip pens.

Have the children color the butterfly. You may want to discuss how the colors in the wings in the computer game match each other.



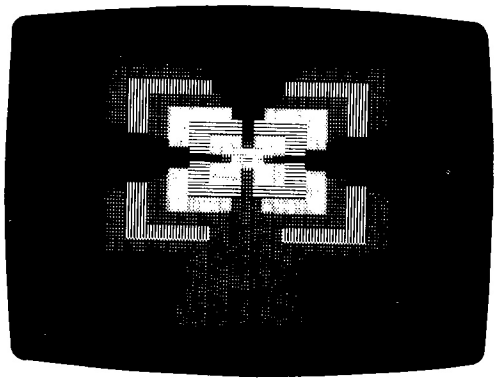
Butterfly NAME

Color the Butterfly

Color the butterfly.

3 The Windmill Game

Objectives



- Relating horizontal and vertical planes (keyboard to screen).
- Pairing concepts (above and left; below and right).
- Learning spatial awareness (quadrants).
- Following directions.
- Identifying the shapes of "b," "d," "p," and "q." (Four letters of the alphabet that are the most difficult to distinguish.)
- Noticing pattern development (windmill).
- Matching colors (windmill blades).
- Noticing two-way symmetry (windmill blades).

In this game, children work with the concepts of above/below and left/right. In addition, they work with the letters *b*, *d*, *p*, and *q* in large, bold shapes. These letters are very difficult for children to recognize and discriminate because they are so much alike. This game allows children to become familiar with these letters as shapes before they need to know them as letters.

Show the children the two blue strips. Place these strips on the computer so that the longer strip divides the keyboard horizontally and the shorter strip divides it vertically. The keyboard is now divided into four parts, just as the screen is divided into four parts when the game begins.

On-Line Presentation

Press [3] when the menu screen appears. "The Windmill Game" will load. The words USE [?] TO RETURN TO PICTURE MENU appear on the screen. Also, four words appear: ABOVE, LEFT, RIGHT, and BELOW. Read the words to your class. Now the two jugglers reappear.

Lesson 1, Play Mode You will see a blue cross dividing the screen into *quadrants*. Point out that the blue strips on the screen correspond to the blue strips on the computer keyboard. Both the keyboard and the screen are divided into four parts, or quadrants: above and below, left and right. If no one does, tell them again. In-

vite one of the children to press a key. If the child presses a key in the upper-left section of the keyboard, a colored box appears in the upper-left quadrant on the screen. The words ABOVE/LEFT appear on the screen. A keypress in any of the other three sections of the keyboard produces a box in that corresponding quadrant on the screen. The appropriate words (ABOVE/RIGHT, BELOW/LEFT, or BELOW/RIGHT) label the choice. Invite other children to press a key, one at a time. A box and the word naming its position will appear on the screen as this is done. After five keys are pressed, the colored boxes disappear and music plays.

Lesson 1, Test Mode A blue box now surrounds the blue cross on the screen. Visual and word clues appear. The visual clue is a rectangle in one quadrant on the screen. The word clue names the position of the box. For example, NOW PRESS ABOVE/LEFT may be seen. When this screen appears, ask the children where they think they must press. When a correct key is pressed, the box will fill with color; it will also be named, as usual.

The test mode consists of five screens. Let the children take turns responding in the test mode. Ask the children to guess what will happen if an incorrect key is pressed. (The child is automatically taken back to the play mode after an incorrect key is pressed a second time.) Explain that two chances are always given to press a key in the area on the keyboard that the clue is hinting at. After the children have successfully completed the test mode, the screen becomes a solid color and music plays. This concludes Lesson 1.

Lesson 2, Play Mode Now a new exercise begins. The blue cross has disappeared from the screen and a red circle appears, like the circle in "The Butterfly Game." Invite a child to see what will happen by pressing any key. If a child presses a key in the upper-left section of the computer keyboard, a colored vertical bar will appear touching the left side of the red circle and extending upward so that the circle now resembles a letter *b*. If the child presses a key in the upper-right section of the keyboard, a colored vertical bar will appear touching the right side of the red circle and extending upward so that the circle and bar look like a letter *d*. A key pressed in the lower-left quadrant of the keyboard produces a symbol resembling a letter *p*. A key pressed in the lower-right quadrant produces a symbol resembling a letter *q*. After five keys are pressed, the test mode begins.

Lesson 2, Test Mode The familiar blue line encloses the screen. In the center of the screen is a red circle with an incomplete vertical bar touching its right side or its left side, and extending above or below the circle. This is the visual clue, indicating the location of the

key on the keyboard that should be pressed. Word clues will also appear. For example, if the incomplete bar is to the right of the circle, extending upward, the words NOW PRESS ABOVE/RIGHT will appear. Invite a child to come to the computer and press a key. If the child presses a key in the above/right quadrant, the bar will fill with color. Then another circle with an incomplete bar on one side will appear. Invite another child to respond. After five turns, the screen will become a solid color and music will play. This ends the test mode for Lesson 2.

Lesson 3, The Windmill There is no test mode in this section. It is exploratory play throughout. A small colored rectangle resides in the center of the screen. A flashing cursor and the words PRESS ONE KEY appear on the screen. Invite a child to press a key. A section of color in the corresponding quadrant on the screen will appear. The four arms of a windmill are built by pressing keys in the four sections on the keyboard. After the arms are filled with color (3 keys pressed in each quadrant), the body of the windmill appears. At this point, repeated pressing of keys cycles the colors in the arms of the windmill.

Children may like to play matching games at this point. One child may press some keys in any of the four sections, cycling the colors. Another child can try to press keys to make the colors match again. You may present Lesson 3 to your class, or you may decide to keep it as a surprise for those who have worked through the program alone. Do what is appropriate for your own group of children.

Off-Line Activities

QUADRANT GAME This activity involves children in a concrete experience with the concepts of ABOVE and BELOW, and LEFT and RIGHT. Because students use their bodies, the concepts are more easily understood.

You need:

- Blue crepe paper.
- Two sets of word cards (above, below, left, and right) from previous activities.
- Scissors.

Divide an area in the classroom into quadrants, using the blue crepe paper, and have the children place the word cards in the appropriate areas. Tell them that you have divided the area into four parts. Explain that these four parts are called *quadrants*. Point out to the students that the same words are being used as were used before, but that now each word will be found in two places (above left, above right, below left, below right).

Have the children place the word cards so that ABOVE LEFT is at the top left of the area, ABOVE RIGHT is at the top right, BELOW LEFT is at the bottom left of the area, and BELOW RIGHT is at the bottom right. Put an object in one of the quadrants and ask a child to identify where the object is by reading the words (or by knowing the name of that quadrant).

Extend this activity by playing a game similar to the games played with the blue sashes and the blue lines discussed earlier. For example, say "All people wearing red belts please stand BELOW LEFT." Children who are wearing red belts then move to the quadrant containing the words BELOW LEFT. Continue with other categories.

I SPY GAME In this activity, the children begin to use ABOVE and BELOW and LEFT and RIGHT in additional ways.

You need:

- Blue crepe paper.
- Two sets of word cards (above, below, left, and right) from previous activities.
- A group of objects (shell, pencil, box, umbrella, etc.)
- Scissors.

Gather the children in a circle and use the blue crepe paper to divide the circle into four parts. Have the children place the word cards in the appropriate areas in the circle and identify the objects. Then say, "I spy, with my little eye, something that you use when it rains." The children will say, "Umbrella!" Say, "Yes." Ask a child to place the umbrella in the ABOVE RIGHT quadrant.

Continue this game with all the objects. When all the objects have been placed, the game can continue as you ask for objects to be moved from one quadrant to another. This game can also be played using initial, middle, or ending sounds of words.

MIRROR GAME In this activity, children use their bodies to experience the concept of symmetry.

You need:

- Small mirrors for each child (optional).

Divide the class into groups of two. Ask students to sit on the floor and face each other. Introduce the word *symmetry*. Explain that *symmetry* means that something is the same on both sides.

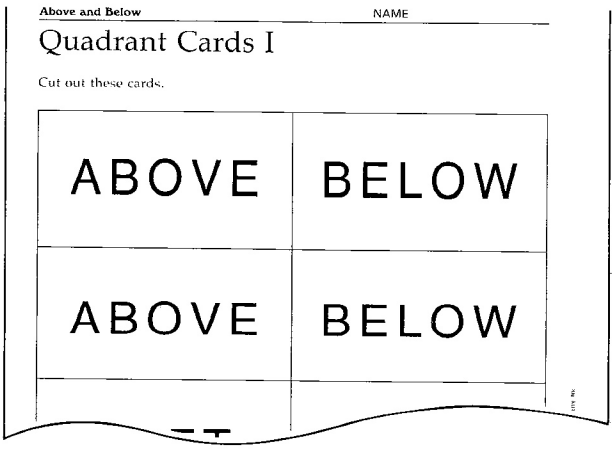
Ask the children what happens when they look in a mirror. Lead them to the point where they know that if they look in a mirror and move one of their hands, they will be able to see that same hand move in the mirror. Tell them that this is what they are going to do. They are going to pretend they are looking at a mirror.

Designate the children facing you as "ones" and the children with their backs to you as "twos." Have all the "ones" start to move, and the "twos" try to copy their movements. (Demonstrate with an aide or with another child.) Explain that it may be easier to follow if the person leading moves slowly. Tell the children that the followers are trying to mirror exactly what the leaders are doing, even doing it at the same time! Let the twos take a turn leading. You may want to play music during this activity.

ABOVE AND BELOW This activity combines all the concepts presented in JUGGLES' RAINBOW.

You need:

- Three activity sheets (pages 12, 13, and 14) for the class.
- Scissors.


Above and Below NAME

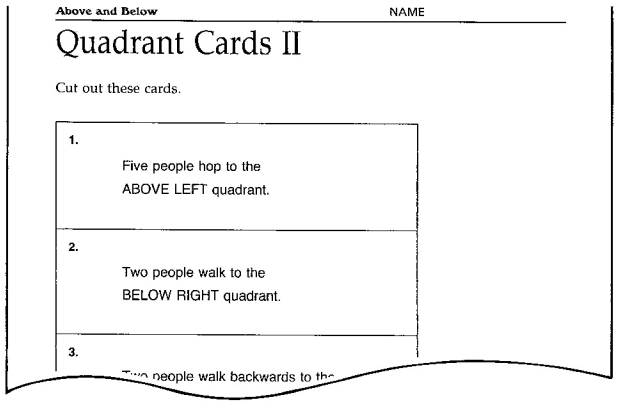
Quadrant Cards I

Cut out these cards.

ABOVE	BELOW
ABOVE	BELOW

Go outside and choose an enclosed area on the playground. Place blue crepe paper strips or chalk marks to divide the area vertically and horizontally into four regions. If you cannot find an enclosed area, you may want to create one by enclosing a section with strips of crepe paper or by drawing a big square with chalk.

If necessary, have the children place the word cards in each region. Choose and read an instruction card. (Children who are able may read the cards.) Have the children follow the directions. You may wish to have children make up their own cards as well.



Above and Below NAME

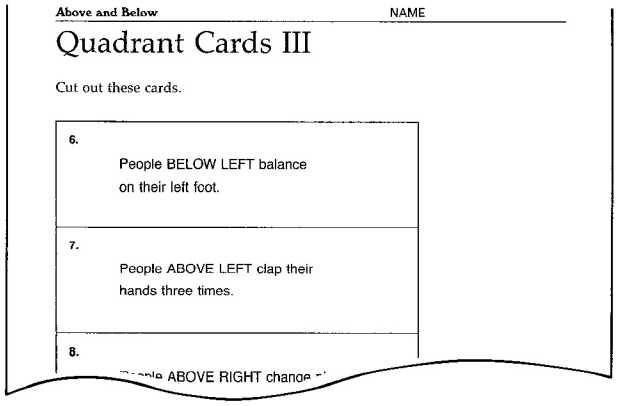
Quadrant Cards II

Cut out these cards.

1. Five people hop to the ABOVE LEFT quadrant.

2. Two people walk to the BELOW RIGHT quadrant.

3. Two people walk backwards to the



Above and Below NAME

Quadrant Cards III

Cut out these cards.

6. People BELOW LEFT balance on their left foot.

7. People ABOVE LEFT clap their hands three times.

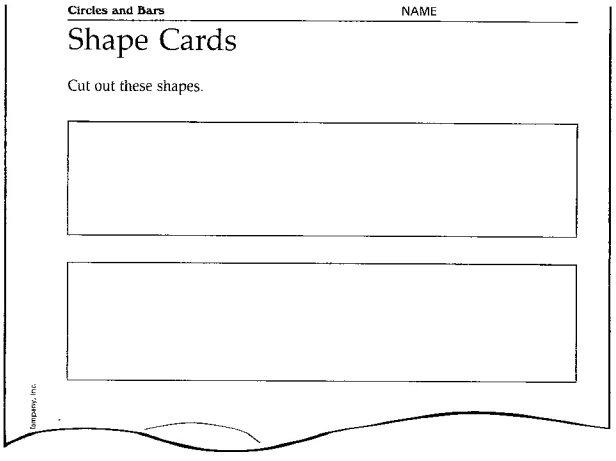
8. People ABOVE RIGHT change

CIRCLES AND BARS In this activity, the children practice forming the shapes *b*, *d*, *p*, and *q*.

You need:

- One activity sheet (page 15) for each child.
- Scissors.

Divide the class into groups of two. Have one child say, "I am placing my bar ABOVE LEFT," and do so, so that the bar and circle resemble the letter *b*. Then have the second child duplicate the pattern. You may want to have the children positioned so that they cannot see each other's desks, and the correct placement of the circle and bar will then



Circles and Bars NAME

Shape Cards

Cut out these shapes.

check their understanding of the communication. Then have the second child say, "I am placing my bar BELOW RIGHT," and do so, so that the bar and circle resemble the letter *q*.

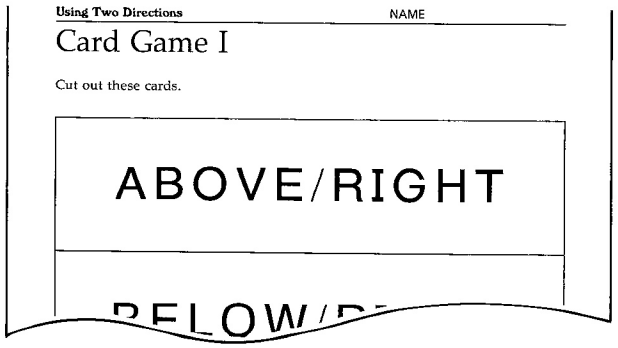
The first child should then duplicate the pattern. The children should continue playing this game until they have practiced forming and identifying the letters *b*, *d*, *p*, and *q* a number of times.

USING TWO DIRECTIONS In this activity, the children practice all the concepts presented in JUGGLES' RAINBOW.

You need:

- Three activity sheets (pages 16, 17, and 18) for each pair of children.
- Two blue tagboard strips for each pair of children.
- Scissors.
- One set of at least 20 objects (buttons, peas, shells, etc.) for each pair of children.

Have two children sit together. Place the blue strips so that the flat surface in front of the children is divided into quadrants. Have the children place the word cards in the appropriate regions. One child should have the objects, and the other child should have the instruction cards. The child with the instruction cards reads a card, and the other child follows the direction on the card. At any time, the children's roles can be reversed.



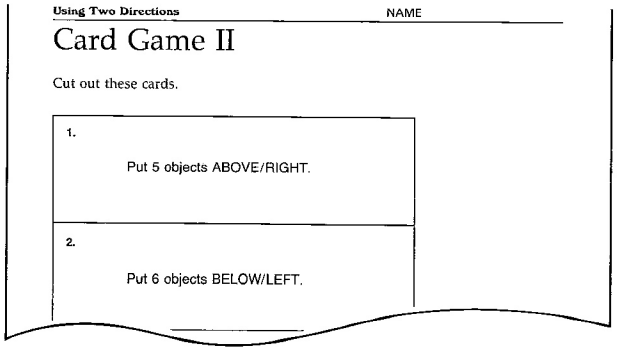
Using Two Directions NAME

Card Game I

Cut out these cards.

ABOVE/RIGHT

BELOW/R



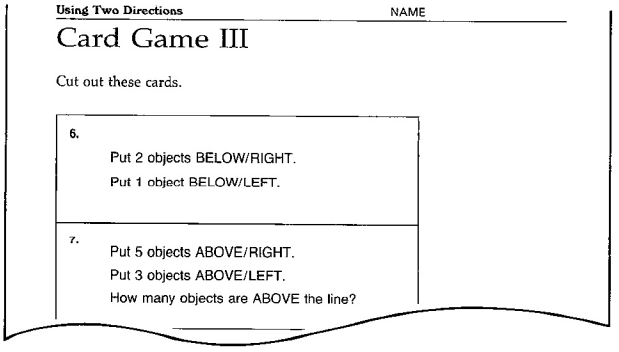
Using Two Directions NAME

Card Game II

Cut out these cards.

1. Put 5 objects ABOVE/RIGHT.

2. Put 6 objects BELOW/LEFT.



Using Two Directions NAME

Card Game III

Cut out these cards.

6. Put 2 objects BELOW/RIGHT.
Put 1 object BELOW/LEFT.

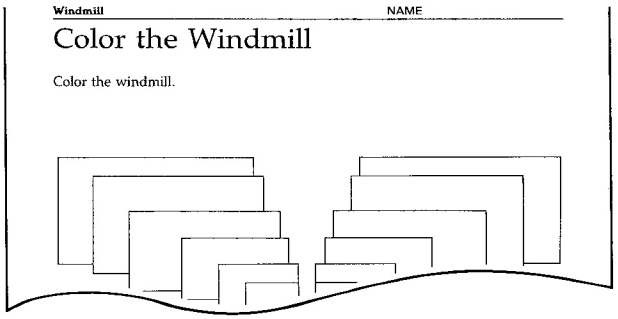
7. Put 5 objects ABOVE/RIGHT.
Put 3 objects ABOVE/LEFT.
How many objects are ABOVE the line?

WINDMILL In this activity, children may copy the colors that they saw in the computer game, or they may color the page with whatever colors they wish to use.

You need:

- One activity sheet (page 19) for each child.
- Crayons or felt tip pens.

Have the children color the windmill. You may want to discuss how the colors in the blades in the computer game match each other.


Windmill NAME

Color the Windmill

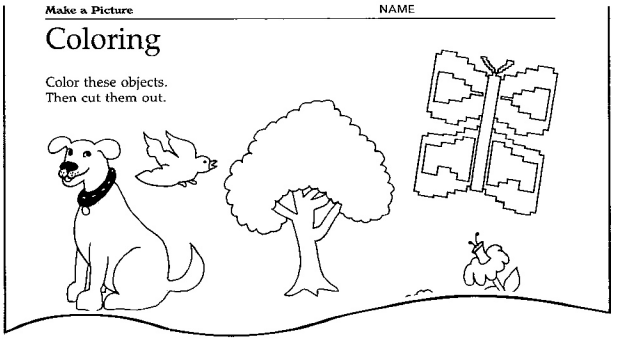
Color the windmill.

MAKE A PICTURE For this activity, children color, cut out, and paste objects onto a page to make a picture, using information they have learned in JUGGLES' RAINBOW.

You need:

- Two activity sheets (pages 20 and 21) for each child.
- Crayons or felt tip pens.
- Scissors.
- Paste.

Have the children color the objects, cut them out, and paste them down on the activity sheet. You may choose to have the children design their own pictures, or you may have them paste their cut-outs in specific areas on the page. For example, you might say, "Place the windmill in the bottom left corner of the page," etc. Display the pictures on a bulletin board, if possible.


Make a Picture NAME

Coloring

Color these objects.
Then cut them out.

Make A Picture NAME

Pasting

Make a picture.
Paste your objects here.

Evaluation

Activity sheets may be selected for written evaluation of the objectives learned. In addition, many teachers find that oral evaluation, while students are in front of the computer or looking at an activity sheet, is a quick and effective method. Some suggested questions and instructions are given for each game.

1 The Rainbow Game

- What happens on the screen after you press a key on the keyboard?
- If you press a key ABOVE the blue strip, where does a bar appear on the screen? If you press a key BELOW the blue strip, where does a bar appear?
- What does the blue strip on the keyboard do?
- What does the blinking square on the screen tell you to do?
- When you are making the rainbow, what happens on the screen when you press an ABOVE key? a BELOW key?
- Do the colors of the rainbow and the rain match?

2 The Butterfly Game

- What happens on the screen after you press a key on the keyboard?
- If you press a key to the LEFT of the blue strip, where does a bar appear on the screen? If you press a key to the RIGHT of the blue strip, where does a bar appear?
- What does the blue strip on the keyboard do?
- What do the incomplete bars on the screen tell you to do?
- When you are making the butterfly, what happens on the screen when you press a key to the LEFT of the blue strip? to the RIGHT of the blue strip?
- Do the colors on the wings of the butterfly match?

3 The Windmill Game

- What happens on the screen after you press a key on the keyboard?
- If you press a key that is ABOVE and to the LEFT of the blue strips, where does a bar appear on the screen?
- What do the blue strips on the keyboard do?
- What do the words on the screen tell you do to?
- Do the shapes on the screen look like letters? Name the letters.
- When you are making the windmill, what happens on the screen when you press a key that is BELOW and to the RIGHT of the blue strips on the keyboard?
- Do the colors on the four windmill blades match?
- Are all four windmill blades the same?

Special Keys

SHIFT **?**

Press both keys at the same time to return to the picture menu.

SPACEBAR

Press SPACEBAR to skip to the next part of the game or to go back to the beginning of the game. You can also press SPACEBAR to skip the opening pictures in each game.

Keeping Current

The following publications and organizations are intended to provide additional information to educators who want to learn more about computers and their use as an educational tool. Each book, magazine and national organization is recommended by several educators and specialists in computer instruction. And, each resource is available nationally. Subjects included range in content from technical issues addressed in the industry to applications of the computer in the classroom and to prominent organizations that will further stimulate and inform computer users. We hope that **Keeping Current** will help keep you up to date.

Books

Coburn, et al. *Practical Guide to Computers in Education.* Massachusetts: Addison-Wesley, 1982.

Goodson, Bobby, and Ann Lathrop. *Courseware in the Classroom.* Massachusetts: Addison-Wesley, 1983.

Hunter, Beverly. *My Students Use Computers: Computer Literacy in K-8 Curriculum.* Virginia: Reston, 1983.

Kleiman, Glenn. *Brave New Schools: How Computers Can Change Education.* Virginia: Reston/Prentice Hall, 1984.

Papert, Seymor. *Mindstorms.* New York: Basic Books, 1980.

Peterson, Dale, ed. *Intelligent Schoolhouse: Readings on Computers in Learning.* Virginia: Reston/Prentice Hall, 1983.

Magazines

Classroom Computer Learning. Pitman Learning Co., 5615 W. Cermak Road, Cicero, Illinois 60550

Compute. P.O. Box 914, Farmingdale, New York 11737

Digest of Software Reviews. Educational Computing Magazine, 301 W. Mesa, Fresno, California 93704

Electronic Learning Magazine. Scholastic Inc., P.O. Box 644, Lyndhurst, New Jersey 07071-9985

Teaching and Computers. Electronic Learning, 902 Sylvan Avenue, Englewood Cliffs, New Jersey 07632

The Computing Teacher. University of Oregon, 1787 Agate Street, Eugene, Oregon 97403-1923

Organizations

International Council for Computers in Education (ICCE). Department of Computer and Information Science, University of Oregon, Eugene, Oregon 97403

Computer-Using Educators (CUE). P.O. Box 18547, San Jose, California 95158

Minnesota Educational Computing Consortium (MECC). 2520 N. Broadway Drive, St. Paul, Minnesota 55113